

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A cable location continuously determining apparatus which determines the location of a cable buried in the ground comprising:

a first electromagnetic signal receiving section which receives an electromagnetic signal originating from alternating current flowing through a metallic wire which is integrated or attached to a cable which is the subject of determination;

a second electromagnetic signal receiving section whose position in a horizontal plane is different from a position in the horizontal plane of the first electromagnetic signal receiving section and which receives the electromagnetic signal;

a location data acquiring section which acquires location data including latitude and longitude of a predetermined location with respect to the apparatus itself;

a first location calculation section which calculates location data of the cable ~~which is the subject of determination~~ including a distance in a measurement base line direction and a distance in a vertical direction, the measurement base line direction being a direction from the first electromagnetic signal receiving section toward the second electromagnetic signal receiving section and being a horizontal direction orthogonal to a moving direction of the apparatus itself, when taking the predetermined location as a standard, using the electromagnetic signal received by the first electromagnetic signal receiving section and the electromagnetic signal received by the second electromagnetic signal receiving section, and which calculates the depth of the cable ~~which is the subject of determination~~ using the distance in the vertical direction included in the calculated location data; ~~and~~

an azimuth calculation section which calculates an azimuth of the moving direction of the apparatus itself using the location data acquired by the location data acquiring section, and which calculates an azimuth of the measurement base line direction from the calculated azimuth of the moving direction of the apparatus itself; and

a second location calculation section which calculates deviations of the cable from the predetermined location for latitude and longitude using the azimuth of the measurement base line direction calculated by the azimuth calculation section and the distance of the cable in the measurement base line direction included in the location data calculated by the first location calculation section taking the predetermined location as the standard, and calculates plane location data of the cable which is the subject of determination for latitude and longitude using the calculated deviations, and the latitude and the longitude included in the location data acquired by the location data acquiring section, and the location data calculated by the first location calculation section.

wherein the plane location data and the depth of the cable are continuously obtained while the apparatus itself is being moved.

2. (Original) A cable location continuously determining apparatus according to claim 1, further comprising a display section which displays information relating to the location of the cable which is the subject of determination based on the location data of the cable calculated by the first location calculation section.

3. (Original) A cable location continuously determining apparatus according to claim 1, wherein the location data acquiring section acquires the location data of the predetermined location by using RTK-GPS.

4. (Currently Amended) A cable location continuously determining method carried out by a cable location continuously determining apparatus which determines the location of a cable buried in the ground, the method comprising:

a location data acquiring step which acquires location data including latitude and longitude of a predetermined location with respect to the apparatus itself;

a first location calculation step which receives an electromagnetic signal originating from alternating current flowing through a metallic wire which is integrated or attached to a cable which is the subject of determination using a first electromagnetic signal receiving section and a second electromagnetic signal receiving section whose position in ~~the~~ a horizontal plane is different from a position in the horizontal plane of the first electromagnetic signal receiving section and which receives the electromagnetic signal, and which calculates location data of the cable including a distance in a measurement base line direction and a distance in a vertical direction, the measurement base line direction being a direction from the first electromagnetic signal receiving section toward the second electromagnetic signal receiving section and being a horizontal direction orthogonal to a moving direction of the apparatus itself,~~which is the subject of determination~~ when taking the predetermined location as a standard, using the received electromagnetic signal, and which calculates the depth of the cable ~~which is the subject of~~

~~determination~~ using the distance in the vertical direction included in the calculated location data; and

an azimuth calculation step which calculates an azimuth of the moving direction of the apparatus itself using the location data acquired by the location data acquiring step, and which calculates an azimuth of the measurement base line direction from the calculated azimuth of the moving direction of the apparatus itself; and

a second location calculation step which calculates deviations of the cable from the predetermined location for latitude and longitude using the azimuth of the measurement base line direction calculated by the azimuth calculation step and the distance of the cable in the measurement base line direction included in the location data calculated by the first location calculation step taking the predetermined location as the standard, and calculates plane location data of the cable which is the subject of determination for latitude and longitude using the calculated deviations, and the latitude and the longitude included in the location data acquired by the location data acquiring step, and the location data calculated by the first location calculation step.

wherein the plane location data and the depth of the cable are continuously obtained while the apparatus itself is being moved.

5. (Currently Amended) A cable location continuously determining program which makes a computer function as a cable location continuously determining apparatus which determines the location of a cable buried in the ground, the apparatus comprising:

a first electromagnetic signal receiving section which receives an electromagnetic signal originating from alternating current flowing through a metallic wire which is integrated or attached to a cable which is the subject of determination;

a second electromagnetic signal receiving section whose position in a horizontal plane is different from a position in the horizontal plane of the first electromagnetic signal receiving section and which receives the electromagnetic signal;

a location data acquiring section which acquires location data including latitude and longitude of a predetermined location with respect to the apparatus itself;

a first location calculation section which calculates location data of the cable including a distance in a measurement base line direction and a distance in a vertical direction, the measurement base line direction being a direction from the first electromagnetic signal receiving section toward the second electromagnetic signal receiving section and being a horizontal direction orthogonal to a moving direction of the apparatus itself,~~receives an electromagnetic signal originating from alternating current flowing through a metallic wire which is integrated or attached to a cable which is the subject of determination using a first electromagnetic signal receiving section and a second electromagnetic signal receiving section whose position in the horizontal plane is different from a position in the horizontal plane of the first electromagnetic signal receiving section, which calculates location data of the cable which is the subject of determination when taking the predetermined location as a standard, using the received electromagnetic signal received by the first electromagnetic signal receiving section and the electromagnetic~~

signal received by the second electromagnetic signal receiving section, and which calculates the depth of the cable which is the subject of determination using the distance in the vertical direction included in the calculated location data; and

an azimuth calculation section which calculates an azimuth of the moving direction of the apparatus itself using the location data acquired by the location data acquiring section, and which calculates an azimuth of the measurement base line direction from the calculated azimuth of the moving direction of the apparatus itself; and

a second location calculation section which calculates deviations of the cable from the predetermined location for latitude and longitude using the azimuth of the measurement base line direction calculated by the azimuth calculation section and the distance of the cable in the measurement base line direction included in the location data calculated by the first location calculation section taking the predetermined location as the standard, and calculates plane location data of the cable which is the subject of determination for latitude and longitude using the calculated deviations, and the latitude and the longitude included in the location data acquired by the location data acquiring section, and the location data calculated by the first location calculation section.

wherein the plane location data and the depth of the cable are continuously obtained while the apparatus itself is being moved.